

APPLICATION FOR UNITED STATES LETTERS PATENT

Title

**METHOD OF MAKING JEWELRY INCLUDING STONES AND RINGS**

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**METHOD OF MAKING JEWELRY INCLUDING STONES AND RINGS**

**RELATED APPLICATIONS**

[0001] This application claims priority under 35 U.S.C. § 119(e) to United States Patent Application No. 60/527,585 entitled "Jewelry Including Stones and Rings and Methods of Making the Same" by Camargo et al. filed December 5, 2003, and is related to United States Patent Application No. \_\_/\_\_,\_\_ entitled "Jewelry Including Stones and Rings" by Camargo et al. filed on the same date as this application. All applications recited in this paragraph are assigned to the current assignee hereof and incorporated herein in their entirety by reference.

**FIELD OF THE INVENTION**

[0002] The invention relates in general to jewelry and methods of making the same, and more particularly, to jewelry including stones and chains attached to stones and methods of making the jewelry.

**RELATED ART**

[0003] Jewelry can include stones that are presented in many different ways, such as with chains or netting. When jewelry includes stones with chains or netting, the stones are typically mounted in a setting, which in turn is connected to the chains or netting. The chains or netting are part of the setting for the stone. The chains or netting typically lie lateral to the stone as to not contact the stone or "hide" the stone from someone (an

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observer) looking at the jewelry when worn by another person.

[0004] One example of the previously mentioned setting includes a crimped piece of metal that has a surface that generally conforms to a surface of the stone. The crimped piece of metal is formed by placing a hard piece of metal over the stone and pounding the metal down around the stone. The stone is attached to the crimped piece of metal using an adhesive compound (e.g., jewelry glue). The adhesive compound holds the stone in place, and the chains or netting are attached to the crimped piece of metal, not the stone.

[0005] Another example of the setting includes a piece of metal with prongs. The metal can be crimped as described previous. After the stone is mounted on the piece of metal, the prongs are bent to hold the stone in place. Chains and netting can then be attached to the piece of metal, not the stone.

[0006] In both instances, the chains or netting are not part of the setting for the stone. Further, the chains or netting may not contact any part of the stone. Such constraints limit the freedom of jewelry designers to design jewelry using stones with chains or netting.

[0007] Another presentation of a stone in jewelry includes wrapping a stone with a piece of solid core wire. The setting for the stone is being created as the wire is wrapped around the stone. Reworking the setting using

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this method can be very difficult and may sometimes be impossible. The solid core wire is essentially fixed in position and does not allow any significant movement of the wire without risking permanent changes in the shape formed by the wire. In other words, the wire is to remain in a fixed position. Movement of the wire may significantly alter the presentation and diminish the value of the jewelry.

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### SUMMARY

[0008] Methods can be used to make jewelry including a stone and a setting. The setting can include rings, wherein at least one of the rings contacts the stone. The rings may be in the form of chains, netting, or both. The rings can be attached to the stone using anchor(s), so that the setting cannot be removed from stone unless the stone, a ring, an anchor or combination thereof is broken or, in the case of hooks, removed only with great difficulty or irreversibly damaging the hooks (e.g., when separating ring and hook combinations). The configurations for the settings and stones and methods described herein can substantially increase the options for designing jewelry, and particularly the use and arrangement of stones in jewelry.

[0009] In one set of embodiments, a method of making jewelry can include attaching an end of a chain or netting to an anchor. The method can also include placing the chain or netting along a surface of a stone. The method can further include attaching another end of the chain or netting to the same or different anchor.

[0010] In another set of embodiments, a method of making jewelry can include attaching ends of a first chain and a second chain to an anchor and attaching ends of a third chain and a fourth chain to a different or same anchor. The method can also include attaching the other ends of those chains together near a common point so that the chains contact the stone.

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[0011] In a further set of embodiments, a method of making jewelry can include wrapping a netting substantially around a perimeter of a stone. The method can also include attaching opposite ends of the netting together to form a setting for the stone.

[0012] The foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as defined in the appended claims.

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**BRIEF DESCRIPTION OF THE DRAWINGS**

- [0013] The present invention is illustrated by way of example and not limitation in the accompanying figures.
- [0014] FIG. 1 includes an illustration of a netting that can be used as part of a setting for a stone.
- [0015] FIG. 2 includes an illustration of fabricating a portion of the netting of FIG. 1.
- [0016] FIGs. 3-6 include illustrations for making jewelry including a stone and the netting of FIG. 1.
- [0017] FIG. 7 includes an illustration of a cross-sectional view of the jewelry at sectioning line 7-7 in FIG. 6.
- [0018] FIGs. 8-13 include illustrations of alternative embodiments using the netting.
- [0019] FIGs. 14-15 include illustrations for making a banded briolette.
- [0020] FIGs. 16-23 include illustrations for jewelry in accordance with a shelling technique.
- [0021] FIG. 24 includes an illustration of an alternative embodiment using a halo.
- [0022] FIGs. 25 includes illustrations of a front-view and the side view of an earring comprising stones having shell-type settings connected by netting.
- [0023] Skilled artisans appreciate that elements in the figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale. For example,

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the dimensions of some of the elements in the figures may be exaggerated relative to other elements to help to improve understanding of embodiments of the present invention.



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#### DETAILED DESCRIPTION

[0024] Jewelry can comprise a stone and a setting. The setting can include rings, wherein at least one of the rings contacts the stone. The rings may be in the form of chains, netting, or both. The rings can be attached to the stone using anchor(s), so that the setting cannot be removed from stone unless the stone, a ring, an anchor or combination thereof is broken or, in the case of hooks, removed only with great difficulty or irreversibly damaging the hooks (e.g., when separating ring and hook combinations). The configurations for the settings and stones and methods described herein can substantially increase the options for designing jewelry, and particularly the use and arrangement of stones in jewelry.

[0025] In some embodiments, jewelry can be made where part of the setting for a stone can include a chain or netting. Many different types of chain or netting configurations are possible. Some of those chain or netting configurations includes shelling, netting, and banding. Other configurations are possible, and therefore, the configurations described herein are to be construed as exemplary and not limiting to the present invention.

[0026] Many options are available with methods of making the jewelry. In one embodiment the method may include attaching an end of a chain or netting to an anchor, placing the chain or netting along a surface of a stone, and attaching another end of the chain or netting to the same or different anchor. In one specific embodiment,

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chains may be used and have ends attached near a common point. In another specific embodiment, netting may be wrapped substantially around the perimeter of a stone, and opposite ends of the netting may be attached together.

[0027] With all of the possible options, jewelry designers are not constrained by the limitations of the fixed settings described in the related art section. After reading this specification, skilled artisans will appreciate that the design of jewelry, particularly with stones, may only be limited by the designer's imagination.

[0028] A few terms are defined or clarified to aid in understanding the descriptions that follow. The term "attached" and its variants, with respect to chains and netting, means that a chain or netting cannot be removed from a stone unless at least one of the stone, ring(s), loop(s), hook(s), chain(s), or netting(s) is broken or only with great difficulty or irreversibly damaging the hooks (e.g., when separating ring and hook combinations).

[0029] The term "chain" is intended to mean a set of links or rings that can be oriented to extend in substantially one direction. Effectively, a chain is a single row of links or rings.

[0030] When referring to rings, the term "directly attached" and its variants are intended to mean ring(s), loop(s), hook(s), chain(s), or netting(s) are attached to one another using a single ring, and the term "indirectly attached" and its variants are intended to mean ring(s),

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loop(s), hook(s), chain(s), or netting(s) are attached to one another using a more than a single ring. For example, a first chain has a link lying within a first ring, a second chain has a link lying within a second ring, and the first and second rings, but not the first and second chains, lie within a third ring. The first chain is directly attached to the first ring but is indirectly attached to the second chain and the second and third rings. The second chain is directly attached to the second ring but is indirectly attached to the first chain and the first and third rings.

[0031] The term "link" is intended to mean substantially identical repeating rings along a length of a chain.

[0032] The term "netting" is intended to mean a set of rings (which may or may not include links) or a mesh that extends in at least two directions. A pair of chains can be connected together by rings to form netting. Netting may or may not include stones incorporated within the set of rings. Netting and mesh can be used interchangeably.

[0033] The term "observer side" is intended to mean the side of jewelry that is seen typically by the public when the jewelry is worn. Jewelry may have more than one observer side.

[0034] The term "ring" is intended to mean a unit within a chain or netting. Rings can be opened or closed and may have a variety of shapes including circles, ovals, oblong or elongated pieces, polygons, and the like. A jump ring

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is a type of ring that is an element used to connect chain(s) netting(s), loop(s), other ring(s), etc. to one another. For example, link(s) of chain, netting(s), loop(s), other rings, or the like may be placed within an open jump ring before it is closed. Chains or netting may include no jump rings, consist only of jump rings, or some jump rings (i.e., not solely jump rings).

[0035] The term "setting" is intended to mean a structure that comprises one or more parts that allow a stone to be attached to another part of a piece of jewelry.

[0036] As used herein, the terms "comprises," "comprising," "includes," "including," "has," "having" and any variations thereof, are intended to cover a non-exclusive inclusion. For example, a method, process, article, or apparatus that comprises a list of elements is not necessarily limited to only those elements but may include other elements not expressly listed or inherent to such method, process, article, or apparatus. Further, unless expressly stated to the contrary, "or" refers to an inclusive or and not to an exclusive or. For example, a condition A or B is satisfied by any one of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present).

[0037] Also, use of the "a" or "an" are employed to describe elements and components of the invention. This is done merely for convenience and to give a general sense of the invention. This description should be read to include one

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or at least one and the singular also includes the plural unless it is clear that it is meant otherwise.

[0038] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. All publications, patent applications, patents, and other references mentioned herein are incorporated by reference in their entirety. In case of conflict, the present specification, including definitions, will control. In addition, the methods, jewelry, and examples are illustrative only and not intended to be limiting.

[0039] To the extent not described herein, many details regarding specific portions of the jewelry and processes for making it are conventional and may be found in textbooks and other sources within the jewelry arts.

[0040] Reference is now made in detail to the exemplary embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts (elements).

[0041] Starting materials are addressed before proceeding to specific designs for the jewelry and methods of making them. Stones used for the jewelry can be nearly any material. Non-limiting examples can include birthstones and gemstones (diamonds, rubies, emeralds, sapphires,

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etc.), man-made or processed materials (zirconia, glass (clear or colored), alumina, plastics, etc.), pearls, ivory, rocks (opals, turquoise, Petoskey stones, etc.), and the like. The stones may be transparent, translucent, opaque, or any combination thereof. Although not required, the stones are typically harder than the materials attached to them, including pins, wires, caps, halos, loops, rings, chains, or netting.

[0042] The pin(s), wire(s), cap(s), halo(s), loop(s), ring(s), chain(s), netting(s) or any combination thereof may include one or more materials. Some non-limiting examples of the materials can include gold (yellow or white), silver, platinum, copper, plastic, zinc, nickel, tin, iron, alloys (e.g., brass, bronze, stainless steel, etc.), and the like. Although not limiting, malleable metals (including alloys) can be used and may include precious metals, such as gold (yellow or white), silver, or platinum. Chains may be available in a number of conventional styles, such as cable chain, curb chain, and the like.

[0043] Adhesive compounds, such as jewelry glue, are conventional. All soldering may be performed using any one of a number of conventional techniques and can include electronic or laser soldering.

[0044] As previously mentioned, there is nearly a limitless number of combinations of shapes, sizes, and materials for the stones, pins, wires, loops, caps, halos, rings, chains, and nettings. The combinations can allow for

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jewelry designs, and particularly settings for stones, that have previously not been possible. Below are detailed descriptions for netting, banding, and shelling techniques and designs. Clearly other designs are possible, and therefore, the descriptions below are not to be construed narrowly.

[0045] Netting can include a set of rings that are fabricated to conform to or mimic the shape of the stone. Some of the rings may be in the form of chains (series of rings). In one embodiment, the netting can be created to fit to the stone before the netting is attached to the stone. The netting will vary depending on the shape of the stone and the desired appearance of the netting. All jump rings may be used or a combination of jump rings and chains may be used.

[0046] FIG. 1 includes an illustration of one non-limiting example of netting 10. A specific fabrication method for the netting is given before addressing other embodiments. The netting in FIG. 1 includes two triangular ends 12 and 14 and a main section 16. The triangular ends 12 and 14 and the main section 16 may include chains 162 and jump rings 122.

[0047] One or both of the triangular ends 12 and 14 may be fabricated before the main section 16. During fabrication, closed jump rings may be placed into an open jump ring. After placement, the open jump ring is closed. As used hereinafter, closing a open jump ring may be performed by: (1) placing the ends of the open jump ring

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close to each other so that rings within that jump ring cannot be removed without moving the ends of such jump ring apart from each other or (2) soldering the ends of the open jump ring together. After reading this specification, skilled artisans can determine which type of closing procedure to use based on their specific applications. The fabrication procedure for the triangular ends 12 and 14 is repeated until the triangular shape completed.

[0048] The main section 16 has a shape that similar to a hammock. The lengths of the inner rows 164 are longer than the lengths of the outer rows 166. Chains 162 have ends connected at jump rings 122 along the inner rows 164. Other than the chains 162, the rest of the main section 16 comprises jump rings.

[0049] The fabrication can start with the chains 162 and inner rows 164, and then proceed to the outer rows 166. Two jump rings 22 (which are substantially similar to jump rings 122) may be attached to the two jump rings 122 of the triangular end 12 as shown in FIG. 2. The jump ring 22, a closed jump ring 24, and a link 26 of chain 162 are inserted into open jump ring 28. The open jump ring 28 is then closed. The process is continued for the other inner row 164. Note that the entire length one of the inner rows 164 may be fabricated before the other, both inner rows 164 may be fabricated so that the lengths of both rows 164 are kept substantially the same, or any combination thereof. Two jump rings 122 may be used to



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connect the inner rows 164 of main section 16 to the other triangular end 14.

[0050] Referring to FIG. 1, the two outer rows 166 of jump rings 122 can be formed in a similar manner to the two inner rows 164. Closed jump rings can be placed into open jump rings and the rings are closed. Note that the inner rows 166 will lie closer to the perimeter of the stone, and the outer rows 164 will lie closer to the center of the stone. Therefore, each of the lengths of the outer rows 166 is shorter than each of the lengths of the inner rows 164. In one embodiment, the fabrication of the inner rows 164 is completed before the fabrication of the outer rows 166. The entire inner rows 164 may be fabricated before the outer rows 166 or the inner rows 164 may be fabricated so that they do not fall behind the fabrication of the corresponding portions of the outer rows 166. Although not required, two jump rings 122 lie along the outer rows 166 and outer perimeter of the triangular ends 12 and 14 to improve the integrity of the netting 10. In another embodiment, the two jump rings 122 along the outer rows 166 may be replaced by a double chain. In still another embodiment, only a single set of jump rings or single chains (e.g., not double chains) may lie along the outer rows 166. Any one or more of the inner rows 164 may have single, double, etc. sets of rings or chains along its (their) length.

[0051] At corners 18, a jump ring 122 along the outer row 164 is connected to two jump rings 122 along the inner row

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166. Depending on the shape of the stone, more than two jump rings 122 along the outer row 166 may be connected to a jump ring 122 along the inner row 164. Note that all the jump rings 122 that are only connected to other jump rings 122 along the outer row 166 may be the same size. FIG. 1 helps to illustrate the connections between the inner and outer rows 164 and 166, and therefore, is not drawn to scale.

[0052] Many different variations may be possible for forming the netting. The exact order of connecting items is typically not critical. Different size jump rings may be used in the different sections or different rows. Also within each of the sections or rows, different sized jump rings can be used. Further, chains may lie long the length of any one or more of the inner and outer rows 164 and 166. The triangular ends 12 and 14 are not required and one or both may be replaced by a wire or other shaped piece (e.g., partially spherical end for the netting 10 instead of the triangular ends 12 and 14) that is inserted through the rings at the end of the main section 16 and a loop (not shown). Different combinations of materials for the jump rings and chains also allow more options to a designer. To list all of the variations would be nearly impossible. After reading this specification, skilled artisans will be able to design and fabricate netting to meet their needs or desires.

[0053] In FIG. 3, the stone 32 can be prepared for the netting 10. In one embodiment, a hole 34 may be drilled

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completely through the stone 32. In order to reduce the appearance of the hole 34, it may be drilled near one of the ends of the stone 32 as illustrated in FIG. 3.

[0054] A wire 42 may be passed through the hole 34 with loops 44 formed from portions of the wire 42 as illustrated in FIG. 4. The ends of the wire 42 may be wrapped around portions of the wire 42 between the loops 44 and the stone 32. Remaining portions of the wire 42 may be cut. Alternatively, the loops 44 may be soldered into position with the ends of the wire 42 cut before or after the soldered is performed. In one embodiment, one of the loops 44 may be formed before the wire 42 is inserted through the hole, and the other loop 44 may then be formed. Regardless of the order of formation of the loops 44, the loops 44 and wire 42 form anchors for the netting 10. The loops 44 are substantially stable and able to withstand stress that may occur during the fabrication process (so that the netting fits snugly against the stone 32, if desired) and during normal use of the jewelry.

[0055] In FIG. 5, one of the loops 44 and a ring at triangular end 12 of netting 10 are inserted into an open jump ring, and the open jump ring is closed to form closed ring 52. The netting 10 is then placed, or more specifically in this embodiment, wrapped around the stone 32 as illustrated by the arrow in FIG. 5. The netting 10 should contact and be snug around the stone 32. In FIG. 6, an open jump ring at triangular end 14 of netting 10 is inserted into the other loop 44, and the open jump ring is

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closed to form ring 62 to form a substantially completed piece. FIG. 7 illustrates a cross-sectional view of the netting 10 including the location of jump rings 122 along the inner and outer rows 164 and 166 and one of the chains 162. Note that the stone 32 lies within a cradle 72 of the netting 10.

[0056] The wire 42, loops 44, and the netting 10 form a setting for the stone 32. Stone 32 cannot be removed from the setting without breaking the stone 32, loops 44 or wire 42, or netting 10. The chains 162 and jump rings 122 within the netting 10 may have limited fluid motion and do not have a hard, unyielding appearance of a stone if it were wrapped using solid core wire. The loops 44 and rings within the netting 10 allow for a wide variety of points from which to attach the piece to other portions of jewelry, including necklaces, bracelets, other netting, and the like.

[0057] In alternative embodiments, the wire-loops combination in FIGs. 5 and 6 is not used to secure the netting 10 to the stone 32. In the embodiment illustrated in FIG. 8, a hole 82 may be drilled partially through the stone 32. A wire 84 may be inserted in the hole 82 and secured in place using an adhesive compound, such as jewelry glue. The end of the wire 84 outside the stone 32 may be twisted to form a loop 86. Jump rings 88 can be used to secure the netting 10 to the loop 86. The wire 84, including loop 86, is an example of a single anchor used in the setting.

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[0058] In the embodiments illustrated in FIGs. 9 and 10, a cap 92 and 102, such as pieces of crimped metal, can replace the wire-loop combinations. The caps 92 and 102 may or may not have pins (not shown) extending from the apex 94 and 104, respectively, down toward the stone 32. If the pin is present, a hole (not shown) may be drilled into the stone 32 to hold the pin. An adhesive compound may or may not be used to secure the cap 92 or 102 to the stone 32. In FIG. 9, attaching loops 96 for the netting 10 are space away from the apex 94, and in FIG. 10, attaching loop 106 lies at or near apex 104. Loop 98 or 106 may be used to attach the piece to other portions of the jewelry.

[0059] In still another embodiment, multiple wire-loop combinations can be used. FIG. 11 includes an illustration of a perspective view of a portion of a stone 112. Holes 114 can be drilled into the stone 112. Pins 116 are inserted into the holes 114. Each of the pins 116 can be substantially identical to the wire 84-loop 86 combination as illustrated in FIG. 8. The pins 116 may be held in place by an adhesive compound (not shown). Alternatively, a tap-and-dye set can be used for forming threads (not shown) along the shafts the pins 116 and within the holes 114. The pins 116 can be secured to the stone by screwing them into the holes 114. After the pins 116 are in place, netting (not shown) can be place over them. A pin 116 and ring(s) within the netting are placed into an open jump ring, which is subsequently closed to

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attach the pin 116 to the netting. The procedure may be repeated for other pins 116 and rings of the netting. In this embodiment, the pins 116 act as multiple anchors for the netting. When multiple pins 116 are used, all or just some of the pins 116 may be attached to netting.

[0060] In yet another embodiment, the pins 116 may be replaced by hooks, such as j-hooks (cane-shaped pieces) 121 as shown in FIG. 12. The j-hooks can act as multiple anchors and be attached to the stone 112 using any of the methods used for the pins 116. After the j-hooks 121 are in place, the netting (not shown) can be placed over the j-hooks 121. The netting can be worked into place so that at least some of the j-hooks 121 and rings are engaged in a manner similar to Velcro™. Similar to the pins 116, not all of the j-hooks 121 need to be used (attached with one or more rings). The attachment of the netting may be completed at this point, or the j-hooks 121 can be bent laterally (e.g., twisted) or bent further (to close or nearly close the j-hook 121 to form a loop) to secure better the netting. In other embodiments, other shapes of hooks are possible. For example, the hooks may be in the shape of a "Y" (similar to an anchor) or a grappling hook.

[0061] Note that soldering between the hooks and netting is not required. The use of hooks may require precise placement of the netting because having to rework the netting after attachment may be difficult, if not impossible. However, use of commercially available precision placement equipment may allow the placement of

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the netting to substantially reduce the likelihood of needing to rework netting placement. The use of the hooks may be well suited for jewelry fabrication by machines because the machines can have the repeatable precise capability, and soldering (a fabricating step) may be eliminated.

[0062] In another embodiment, no pins, hooks, holes in the stone, or adhesive compounds may be used. More particularly, the rings may be attached to the stone without the use of an adhesive compound or a pin or wire extending at least partially into the stone. FIG. 13 includes an illustration where netting 130 surrounds substantially all of the perimeter of the stone 132. The netting 130 can be similar to the main section 16 of netting 10 but does not have the triangular ends 12 and 14. The main section is continued until the netting 130 can cover the perimeter of the stone 132.

[0063] Regarding fabrication of the netting 130, the inner row(s) of the netting 130 are formed at the same time or before corresponding portions of outer rows of the nettings. After the netting has been fabricated to conform to the shape of the stone, the netting 130 is wrapped so that the netting substantially surrounds the perimeter of the stone 132. Opposite end of the netting 130 are attached together to form a setting for the stone 132. The ends may be attached together using ring(s), a wire, a combination of rings and wire, or the like. From a cross-sectional view, the stone 132 lies within a cradle

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(not shown) of the netting 130. In FIG. 13, the opposite ends of the netting are connected together using jump rings.

[0064] In still a further embodiment, the netting may include plastic. The plastic netting may be pre-fabricated or may be shaped to the piece similar to the chains and jump rings. In still another embodiment, the plastic netting may be attached and heated to increase the tension in the netting (similar to shrink wrap). The plastic netting may be set of rings or a single piece of plastic mesh.

[0065] Note that in many of the embodiments, jump rings used to attach the ends of the netting to itself or to loops or pins may be replaced by wire. Also, one or more wires, chains, set of jump rings, or the like may be attached to the netting and extend across some of the exposed face (not covered by the perimeter netting) of the stone. In one embodiment, the additional wires, chains, or sets of jump rings may be used as part of the setting, as ornamentation (e.g., lie along the observer side of the stone), or a combination thereof.

[0066] The orientation of the netting can be changed so that the netting appears to be a sash around the stone. The sash appearance can be achieved by orienting the length of the netting to extend between the front (i.e., observer side) to the back of the stone rather than along the perimeter of the observer side.



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[0067] In many embodiments, the setting for the stone can comprise netting that surrounds at least half of the perimeter of the stone. This helps to keep the stone from popping out of the netting. In the embodiment of FIG. 6, the netting 10 surrounds  $2/3$  to  $5/6$  of the perimeter of the stone 32. In the embodiment of FIG. 13, the netting 130 surrounds substantially all of the perimeter of the stone 132. After reading this specification, skilled artisans appreciate that the netting may surround less than half of the perimeter of the stone.

[0068] Banding is similar to netting, but is typically easier to perform compared to netting. With banding, chain(s) can be used to highlight the stone. Unlike the netting embodiments above, where the relative positions of the netting and stone are set more firmly (but still allow some fluid motion), the banding can allow more movement of the chain(s) relative to the stone. In one embodiment, the stone 32 and hole 34 in FIG. 3 may be used as a starting point. A chain 142, as illustrated in FIG. 14, can be fabricated (as a row of jump rings or links) or cut (if the chain is already made) so that its length extends from near the hole 34 on one side of the stone 32, around the perimeter of the stone 32 to the hole 34 on the other side of the stone. A ring at or near one end of the chain is placed onto a wire 144, and the wire 144 can be twisted to form a loop 146. The other portion of the wire 144 is fed through the hole 34. A ring at or near the other end of the chain 142 is placed onto the wire 144. This other

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end of the wire 144 can be twisted to form another loop 146. Extra lengths of the wire 144 may be cut. At this point, a banded stone has been formed.

[0069] Optionally, further processing can be performed on the banded stone as illustrated in FIG. 15. A closed ring 152 and one of the loops 146 may be placed into an opened jump ring that is then closed to form closed ring 154. The same procedure is repeated for the other loop 146 and other closed ring 154.

[0070] Again, many options exist for different shapes, sizes, and materials and combinations thereof. Many of the alternatives used for securing the netting as described in FIGs. 8-12 may also be used for banding.

[0071] Shelling can include a setting where chains, at one end, are attached together or near a common point, and at least some, if not all, of the chains diverge from that common point. Between the two ends of any one of the chains, that chain may or may not be connected to other chains or other parts of the jewelry.

[0072] In one embodiment of shelling, the stone 32 as illustrated in FIG. 4 may provide a starting point in the process. First end(s) of one or more chains 161 may be placed on an open ring 163 as shown in FIG. 16. A closed ring 165 may be placed on the open ring 163, and the open ring 163 closed to form ring 173 as illustrated in FIG. 17. This pattern of chains 161 and rings 165 and 173 may be repeated any number of times.

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- [0073] One of the closed rings 165 and one of the loops 44 can be placed in another open ring 182 as illustrated in FIG. 18. That other open ring 182 can be soldered closed to form closed ring 192 in FIG. 19. More or fewer rings and ring-chain sets may be used compared to what is shown in FIG. 19.
- [0074] In another embodiment, the closed ring 165 may be replaced by link(s) of chain(s). In still another embodiment (not shown), closed ring 165 may be omitted and one of the loops 44 substituted in its place. In this manner, the shelling can be attached to the stone 32 as it is fabricated.
- [0075] The procedure for the other loop 44 (not shown in FIGs. 16-19) along the opposite side of the stone 32 is substantially identical. Note that intermediate rings (e.g., closed rings 173) between ring-chain sets may be omitted or additional intermediate rings may be used between each pair of ring-chain sets. To list all of the alternatives would be nearly impossible.
- [0076] Referring to FIG. 20, an open jump ring 202 may be used to connect the other ends (e.g., second ends) of chains 161 lying along one side of the stone 32. The open jump ring can be closed to form closed ring 212 in FIG. 21. The same procedure may be repeated for the other side of the stone 32, so that another closed ring 212 (not shown in FIG. 21) connects the other ends of chains lying along the other side of the stone 32.

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[0077] In one embodiment, the positions of the two rings 212 on each side of the stone 32 cannot touch each other. Those two rings 212 are pulled snug and placed into a jump ring 222 in FIG 22. The jump ring 222 is then closed to form a closed ring 232 as illustrated in FIG. 23. Note that the wire 42, including loops 44, acts as an anchor to allow pressure to be applied so that the chains 161 can be snugly fitted to the stone 32 during the attaching process using jump ring 222. In another embodiment, the two rings 212 may touch each other.

[0078] At the point in the process, in one embodiment, a substantially finished piece of jewelry has been formed. In the finished piece, chains 161 are interconnected by rings to form the shelling for the stone 32. The chains 161 have limited movement, but are more fluid (in movement) compared to wrapping the stone with a single piece of wire. The shelling is part of the setting, and the stone 32 cannot be removed from the shelling unless any one or more of the stone, rings, loops, or chains are broken.

[0079] In another embodiment (not shown), pairs of chains do not need to be connected to the same ring for shelling. The chain pattern can alternate with the rings. More specifically, a ring closest to one of the loops 44 may have all chains within that ring lying along one side of the stone 32. The next ring having chain(s) may have its chain(s) lying along the opposite side of the stone 32. In this manner, the chains can be alternating front-back-

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front-back for a series of rings attached to that same loop 44.

[0080] A number of options available for the netting 10 may be used for shelling. Similar to netting 10, shelling can be asymmetric with respect to the stone 32. The orientation of the shelling may be changed. The shelling may be rotated laterally (loops 44 lying along front and back of stone 32 instead of the sides) or vertically (common point lying at the side or top of the stone 32 instead of the bottom as shown in FIG. 22. Other positioning is possible.

[0081] In another shelling embodiment, a "halo" may replace the wire 42 and loops 44. The halo has an annular opening through which a portion of the stone may be placed completely through. The halo forms an anchor that does not require a cap, an adhesive compound, or a hole to be drilled into a stone. Referring to FIG. 24, the halo 242 may be a chain in the form of links or jump rings. Alternatively, the halo 242 may include solid ring (not shown) with or without loops. The solid ring may include notches or other features to help to keep the chains or jump rings from moving too much. In the embodiment illustrated in FIG. 24, chains 161 may be attached to the halo 242. The other ends of the chains may be attached using ring 244 (e.g., ends of chains inserted into an open ring before it is closed). Halos may also be used with netting and banding.

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[0082] In an alternative embodiment, an adhesive compound can be used to achieve jewelry having chains, netting, or a combination of both as part of the setting. The adhesive compound may be applied to the stone, chains, netting or any combination thereof. The chains, netting, or combination are placed onto the stone and can be held in place until the adhesive compound has set or been cured. Many different adhesive compounds may be used and the actual compound used is not critical. Jeweler's glue is commonly used in jewelry. Radiation-activated (e.g., ultraviolet radiation curable) adhesive compounds may also be used. Generally, the adhesive should have good bonding strength and be transparent, although these characteristics are not required. After reading this specification, skilled artisans will be capable of selecting adhesive compound(s) to meet their desires. Holes in the stone and pins or wires are not required. Just like the other embodiments described herein, the chains, netting, or combination thereof can be the setting for the stone and allow a greater number of attachment points to other parts of the jewelry compared to conventional settings for stones.

[0083] Other combinations of rings and chains can be made to form other elements for jewelry. Netting, banding, and shelling are merely examples and not meant to limit the present invention.

[0084] Regardless whether the finished piece includes one or more of the netting, banding, or shelling, the finished

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piece may be incorporated with other articles to form jewelry, such as a necklace, earring, bracelet, brooch, etc. Any of the netting, banding, and shelling can be used in tying stones together. Jump rings between chains or other jump rings on different stones or between loops of different stones can be used. A plurality of the finished pieces, whether the same or different types, can be part of the jewelry.

[0085] FIG. 25 includes illustrations of front and side views of an earring 250, which is an example of jewelry. The earring 250 includes two stones 251 and 253 with shelling 252 and 254 and netting 256 in between. The netting 256 may include jump rings, chains, or combinations thereof. The upper stone 253 with shelling 254 is attached to the hook 260 using a ring at location 262 and to the netting 256 at locations 264. The lower stone 251 with shelling 252 is attached to the netting 256 at locations 266. The attachments at locations 264 and 266 may be achieved using jump rings. Again, the earring 250 is merely an example and shows some of the flexibility for designing jewelry.

[0086] The use of chains and rings as at least parts of settings for stones allows much more flexibility in designing jewelry. A significantly larger number of attaching points to other parts of the jewelry is possible. New arrangements and orientations may now be realized. The variety of shapes, sizes, and materials allow a nearly infinite number of combinations to be made.

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[0087] The settings described herein may be more appealing and appear more "fluid" and less "industrial" compared to conventional crimped metal settings. The settings described herein allow more symmetric settings (both from a visual and mass (i.e., center of gravity) perspective) to be made because a relatively dense piece of metal is not required to lie on one side of the stone. The symmetry can allow the stone-setting combination to hang more vertically in free space because the center of gravity is not shifted due to the crimped metal.

[0088] The jewelry and process for making it does not require new materials or fabrication equipment. Therefore, the risks associated with new materials and equipment is avoided.

[0089] In the foregoing specification, the invention has been described with reference to specific embodiments. However, one of ordinary skill in the art appreciates that various modifications and changes can be made without departing from the scope of the present invention as set forth in the claims below. Accordingly, the specification and figures are to be regarded in an illustrative rather than a restrictive sense, and all such modifications are intended to be included within the scope of present invention.

[0090] Benefits, other advantages, and solutions to problems have been described above with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and any element(s) that may cause any



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benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential feature or element of the invention.